

**Cosmetic Preparation Containing a Metallic Pigment**

The invention relates to a cosmetic preparation containing a metallic pigment. The cosmetic may be in the form of loose or pressed powders, eye shadows, lipsticks, eyeliners, nail polishes, blushes, hair colorants, mascaras, liquid self-tanners, and the like.

Cosmetics of the type in question, such as loose or pressed powders, eye shadows, lipsticks, eyeliners, nail polishes, blushes, hair colorants, mascaras, liquid self-tanners, and the like, are composed of a carrier material or a base formulation as well as color-imparting and effect-imparting means of various types, with the goal to obtain a certain color effect on the skin, lips or hair, or to optically cover up skin flaws.

These color-imparting and effect-imparting means may be colorants, lacquered organic colorants, inorganic or organic pigments and/or effect pigments, wherein especially in case of the effect pigments, special emphasis lies on the desire to attain a different color impression or brightness impression depending on the viewing angle of the applied preparation. To achieve this purpose, pearlescent pigments in particular have conventionally been used in the field of cosmetics.

Pearlescent pigments are based on flake-shaped mica particles as a substrate, which are coated with metal oxides, mainly with titanium dioxide or iron oxide. Pigments of this type on the basis of titanium oxide, however, are relatively transparent due to their composition and, as a rule, exhibit a color impression only at the so-called "glancing angle", whereas pigments that are based on iron

oxide do provide more coverage, but the angle-dependent color impression or brightness impression is pushed to the background. The advantage of these pigments lies in their high degree of chemical and thermal stability, which in essence precludes negative effects for example on a binding agent, and in that they are well tolerated by the skin.

To the extent that metal effect pigments have been used for cosmetic purposes until now, they do have the advantage that they are covering, color-intensive and highly brilliant, however, they have the shortcoming, in particular, that they do not always meet the hygienic and application-specific requirements, considering especially that metal ions from the metal component, for example copper or zinc ions, are released into the carrier medium and can cause undesired effects, such as the gelling of binding agents and color changes. In the applied condition, contact with sweat or saliva may occur, which means with acidic or alkaline media, which can also cause an increased release of ions, which affect not only affect the carrier substance but may possibly lead directly to health-related damage, such as skin irritations.

From DE 44 37 753 A1 a lustrous pigment is known that is also usable for cosmetic purposes, which consists of at least five layers and is accordingly expensive to produce.

DE 198 36 810 A1 describes metal pigments that are coated in an aqueous medium, which involves the shortcomings that will be described below.

DE 101 14 445 A1 and DE 101 14 446 A1 describe iron pigments that are not approved for cosmetic applications. The same applies for the iron pigment according to EP 0 673 980 A2, which is treated at a raised temperature in an oxygen atmosphere.

US 6,398,861 B1 describes a metal pigment composition, not a metal pigment as such. Reference is made to an aqueous system, and the use of tensides is mentioned, which are completely unsuitable for the inventive technical solution that will be described below.

With this as the starting point, the invention is based on the object to further develop a pigment of the above type in such a way that it better meets the hygienic, health-related and application-specific requirements than pigments that are conventionally used in the field of cosmetics.

This object is met according to the invention in such a way that a metallic substrate has a layer that uniformly encapsulates said metallic substrate, wherein said layer is produced in the sol-gel process, provides a barrier effect with respect to sweat and saliva, and prevents direct contact between the skin and metallic substrate.

In such a sol-gel process, a barrier layer is built up around the metallic substrate in organic solution or suspension from suitable monomeric metal-oxide pre-stages, e.g., alkoxy silanes, with the use of suitable catalysts. Compared to coating methods from aqueous solutions, e.g., with water glass, this process offers the advantage that no additional pretreatment is required to activate or degrease the base pigment, which is coated with auxiliary grinding agents, and the obtained layer cannot be

contaminated through additional ions, such as e.g., chlorides or sulfates. Additionally, a layer that is obtained in this manner, since it was obtained from monomeric pre-stages, offers the advantage of a particularly even, dense and therefore high-quality, optically not perceptible layer, which is additionally also harmless from health-related and hygienic points of view, as they are relevant particularly for the cosmetic application.

A metal pigment that has been improved in this manner does not exhibit any, or only a significantly reduced, agglomeration tendency or flocculation tendency as compared to an uncoated metal pigment or one that has been coated in the aqueous system. The optical properties are not impacted by the surrounding layer, or only to a small degree. The same applies for the haptic properties.

The layer is preferably compatible with the binding agent/carrier material of a cosmetic preparation.

The layer preferably consists of  $\text{SiO}_2$  that has been produced in sol-gel processes. Chemically similar surfaces are found in numerous cosmetic compositions, such as, e.g., in the form of bentonites.

For the present invention, it should be emphasized in particular that the metal pigment is water-wettable, so that it can be excellently and homogeneously incorporated into the widest variety of different cosmetic preparations.

The percentage of metal pigment in the formulation is advantageously 0.2% to 10%, especially 0.2% to 5%.

The preparation may be available especially in the form of a creme or lotion. In this context it is particularly advantageous that, with proper dosing, it imparts a uniform optical impression of the skin without changing the color of the skin. Provision may also be made, however, for the preparation to even out or cover up skin impurities.

The preparation may advantageously also be available in the form of a self-tanning creme or lotion.

In order to achieve that the preparation feels smooth in its application, it is necessary that the flake-shaped pigments have a large ratio of diameter to thickness (aspect ratio) and only minor surface roughness. This was achieved according to the invention in such a way that the silica particles that form the encapsulation have an average diameter of  $< 100$  nm. It is particularly advantageous if these particles are so fine that they exceed the limits of resolution even viewed under a scanning electron microscope.

Particularly favorable properties regarding optical appearance and stability can also be achieved in a cosmetic preparation that is implemented as a hair gel. An implementation as nail polish is possible as well.

The latter may be characterized in that it is based on nitrocellulose and may, among other things, also contain benzotriazoles, thus ensuring the shelf-life of metal-pigmented formulations also for extended periods of time.

The invention will be described in more detail below based on preferred example embodiments:

1<sup>st</sup> Example Embodiment: **Blush (Hot Poured)**

INCI Name	Tradename	% w/w	Manufacturer
<b><u>Phase 1</u></b>			
Silica	Speron P-1500	5	Prespense
Mica	Azco Mica BC 1020 WG	26	Prespense
Red Iron Oxide	Cosmetic Russet C33-8075	5.9	Sun Chemicals
Black Iron Oxide	Cosmetic Black C33-134	0.1	Sun Chemicals
Copper (and) Silica	Visionaire Lava	10	Eckart
<b><u>Phase 2</u></b>			
Isoeicosan	Permethyl 102A	44	Perspense
Carnauba Wax	Carnauba #1 Flake	3	Strahl&Pitsch
C12-C15 Alkyl Benzoate (and) Stearalkonium Bentonite (and) Propylene Carbonate	Tixogel FTN	6	Südchemie Rheologicals

Method of Production:

1. The first four components of phase 1 are homogenized in a mixer until uniformly distributed.
2. Afterwards the pigment Visionaire Lava is added and mixed in homogeneously.
3. The components of phase 2 are stirred together in a mixer and heated to between 80°C and 85°C.
4. The pigment mixture from phase 1 is slowly stirred into phase 2.
5. Mixing until homogenous.
6. At a temperature of 82°C, pouring into pan-like molds.

2<sup>nd</sup> Example Embodiment: **Foundation (Water-in-Silicone)**

INCI Name	Tradename	% w/w	Manufacturer
<b><u>Phase A</u></b>			
Cyclopentasiloxane	Dow Corning 245 Fluid	3	Dow Corning
Cyclopentasiloxane (and) Dimethiconol	Dow Corning 1501 Fluid	10	Dow Corning
Titanium Dioxide (and) Methicone	BTD-M	9.5	Kobo
Mica (and) Methicone	GMS-MS2	3.68	Kobo
Iron Oxides Yellow (and) Methicone	BX YO-MS2	1.45	Kobo
Iron Oxides Red (and) Methicone	BXRO-MS2	0.78	Kobo
Iron Oxides Black (and) Methicone	BXBO-MS2	0.2	Kobo
<b><u>Phase B</u></b>			
Cyclopentasiloxane (and) PEG/PPG-18/18 Dimethicone	Dow Corning 5225C	10	Dow Corning
C30-45 Alkyl Methicone	Dow Corning Cosmetic Wax AMS C30	3	Dow Corning
Cyclopentasiloxane	Dow Corning 245	2	Dow Corning
Bronze powder (and) Silica	Visionaire Maize Gold	2	Eckart
<b><u>Phase C</u></b>			
Polysorbate 20	Tween20	0.5	Uniqema
Preservative	Uniphen P-23	0.3	Induchem
Sodium Chloride		0.75	
Deionized Water		52.84	

**Method of Production:**

1. Grind the pigments in phase A
2. Add the first three components of phase B to phase A and melt the phases together at 75°C.

3. Stir Visionaire Maize Gold into the combined phases A and B.
4. Mix together phase C and heat to 70°C.
5. Slowly add phase C to the mixture from phase A and B under homogenization.
6. Cool to room temperature in the paddle mixer.

3<sup>rd</sup> Example Embodiment: **Metallic Styling Gel**

INCI Name	Tradename	% w/w	Manufacturer
<b><u>Phase 1</u></b>			
Deionized Water		62.7	
Acrylates/ C10-30 Alkyl	Ultrez 21	0.66	Noveon
Acrylate Crosspolymer			
Aminopropanol diluted 1:10	AMP-95	1.33	Angus
<b><u>Phase 2</u></b>			
Propylene glycol		1	
<b><u>Phase 3</u></b>			
Polyquaternium-11	Gafquat 755N	4	ISP
Deionized Water		25	
Aminopropanol diluted 1:10	AMP-95	0.02	Angus
Phenoxyethanol (and) Methylparaben (and) Butylparaben (and) Ethylparaben (and) Propylparaben	Uniphen P-23	0.3	Induchem
Mica (and) Titanium Dioxide	Prestige Dazzling Silver	2.5	Eckart
Aluminum (and) Silica	Visionaire Bright Silver Sea	2.5	Eckart

Production:

1. Work the thickening agent into water.
2. Neutralize to a pH between 6.5 and 7 with AMP.
3. Mix into propylene glycol.
4. Mix in polyquaternium-11 in water to produce phase 3.
5. Neutralize phase 3 to a pH between 6.5 and 7.
6. Add phase 3 to the combined phases 1 and 2.
7. Mix in the preservative.
8. Mix in the pearlescent and metal pigments.

**4<sup>th</sup> Example Embodiment: Moisturizing Creme**

INCI Name	% w/w
<b><u>Phase 1</u></b>	
Cyclomethicone	72
Dimethicone	20
C12-C15 Alkyl Benzoate (and) Stearalkonium	40
Bentonite (and) Propylene Carbonate	
Cetyl Dimethicone Copolyol	4.8
Visionaire Bright Natural Gold	2
<b><u>Phase 2</u></b>	
Deionized Water	252.5
Sodium Chloride	1.5
Phenoxy ethanol (and) Methyl paraben (and)	1.2
Butyl Paraben (and) Propyl paraben	

**Production:**

1. Mix and heat phase 1 to 78°C.
2. Mix and heat phase 2 to 78°C.
3. Add phase 2 to phase 1 under homogenization.
4. Cool to room temperature in the paddle mixer.

5<sup>th</sup> Example Embodiment: **Bronze and Pearlescent Lipstick**

INCI Name	Tradename	% w/w	Manufacturer
<b><u>Phase 1</u></b>			
Carnauba Wax	Carnauba #1 Flake	3.0	Strahl & Pitsch
Beeswax	Yellow Beeswax	2.5	Strahl & Pitsch
Candelilla Wax	SP-75	5	Strahl & Pitsch
Ozokerite	Ozokerite 170	2	Koster Keunen
PTFE	Microslip 519	2	Micro Powders
Castor Oil	Castor Oil USP	17.82	SüdChemie Rheologicals
Polyisobutene	Permethyl 104A	7	Presperse
Isostearyl Isostearate	Isostearate d'Isostearyle	5	Gattefosse
Isononyl Isononanoate	Dermol 99	18	Alzo
Caprylic / Capric Triglycerides	Liponate GC	10	Lipo
<b><u>Phase 2</u></b>			
D&C Red #27 Aluminum Lake	33% dispersion in Castor Oil	10	Sun Chemicals
FD&C Blue #1 Aluminum Lake	50% Dispersion in Castor Oil	0.03	Sun Chemicals
<b><u>Phase 3</u></b>			
Propyl Paraben		0.10	
BHT		0.05	Eastman
Titanium dioxide (and) Mica (and) Iron Oxide	Prestige Bright Fire Red Pearl	7.5	Eckart
Bronze (and) Silica	Visionaire Bright Natural Gold	7.5	Eckart
Boron Nitride	Soft Touch CC5102	2.5	Advanced Ceramics

**Production:**

1. Mix phase 1 in a low-shear mixer.
2. Heat to between 80°C and 84°C.

3. Add phase 2 and mix until homogenous.
4. Add phase 3
5. Pour into a lipstick mold at 70°C.

6<sup>th</sup> Embodiment Example: **Bronze and Pearlescent Eye Shadow (Pressed)**

INCI Name	Tradename	% w/w	Manufacturer
<b><u>Phase 1</u></b>			
Mica	Azco Mica BC 1020wg	34.9	Presperse
Titanium Dioxide	Tronox CR-837	5.5	Kerr McGee
Chromium Oxide Green	Chromium Oxide Green	2.8	LCW
Iron Oxide Yellow	Iron Oxide Yellow	1.8	Sun Chemical
Zinc Stearate	Zinc Stearate SAK 25p	5.5	USP Blachford
Boron Nitride	Soft touch CCS 102	1.8	Advanced Ceramic
<b><u>Phase 2</u></b>			
Mica (and) Titanium Dioxide (and) Iron Oxide	Prestige Sparkling Lemon Gold	18.35	Eckart
Bronze (and) Silica	Visionaire Bright Natural Gold	18.35	Eckart
<b><u>Phase 3</u></b>			
Dimethicone	Dow 200	5.5	Dow Corning
Caprylic/Capric Triglycerides	Liponate GC	5.5	Lipo

**Production**

1. Mix the components of phase 1 in a mixer until homogenous.
2. Add phase 2 and mix in homogeneously
3. Spray in phase 3 and mix in homogeneously

7<sup>th</sup> Embodiment: Nail Polish

Designation	% w/w	Manufacturer
¼ second Parcell Ultra RS Nitrocellulose	19.2	Green Tree
½ second Parcell Ultra RS Nitrocellulose	2.7	Green Tree
Ethyl Acetate	32.1	
n-Butyl Acetate	27.6	
Isopropyl Alcohol	6.8	
Dibutyl Phthalate	4.2	
Camphor	1.4	
Stearalkonium Bentonite	1.0	Süde Chemie Rheologicals
Visionaire® Cinnamon	5.0	Eckart

Production:

1. Disperse the stearalkonium bentonite in butyl acetate and activate with a mixture of 2:1 isopropanol/H<sub>2</sub>O, with a percentage of 30 wt. % stearalkonium bentonite.
2. Add the solution to the remaining components, including any optionally desired additional colorants to attain special color combinations (except for Visionaire® Cinnamon), and blend uniformly.
3. Add Visionaire® Cinnamon under minimal shear stress and blend uniformly.

8<sup>th</sup> Example Embodiment: Silver Mascara

Designation	% w/w
<b><u>Phase A</u></b>	
Deionized Water	43.40
Hydroxyethylcellulose	0.30
Triethanolamine	1.50
<b><u>Phase B</u></b>	
Visionaire Silver Sea	10.00
Spherical Silica Beads	3.00
<b><u>Phase C</u></b>	
Stearic Acid	4.00
GMS	1.50
PEG-100 Stearate	1.00
Beeswax	5.00
Carnauba wax	3.00
Candellila wax	3.00
<b><u>Phase D</u></b>	
Polyacrylic Emulsion	5.00
<b><u>Phase E</u></b>	
Phenoxyethanol	1.00
Methylparaben	0.25
Ethylparaben	0.30
Propylparaben	0.15
Butylparaben	0.10

9<sup>th</sup> Example Embodiment: **Self-Tanning Lotion**

INCI Name/ Designation	% w/w
<b><u>Phase 1</u></b>	
Deionized Water	55.625
Sodium Chloride	0.375
<b><u>Phase 2</u></b>	
C12-15 Alky Benzoate	10.00
Cyclomethicone	8.00
Dimethicone	5.00
Cylomethicone (and) Quaternium-18 Hectorite (and)	10.00
Propylene Carbonate	
Cetyl Dimethicone Copolyol	1.20
<b><u>Phase 3</u></b>	
Visionaire Bright Natural Gold	0.50
<b><u>Phase 4</u></b>	
Dihydroxyacetone	4.00
Deionized Water	3.00
<b><u>Phase 5</u></b>	
Phenoxyethanol (and) Methylparaben (and)	0.30
Butylparaben (and) Ethylparaben (and)	
Propylparaben	

**Production:**

1. Pour deionized water into a mixing vessel, dissolve sodium chloride in it while stirring, heat to 75°C.
2. Homogenize components of phase 2 and heat to 75°C.
3. Stir phase 3 into phase 2, keeping temperature at 75°C.
4. Add phase 1 to the mixture of phases 2 and 3 and disperse homogeneously.
5. Transfer the dispersion into a paddle mixer.
6. Slowly cool mixture to 50°C while stirring
7. Add the premixed phase 4 as well as phase 5.
8. Cool to room temperature while stirring evenly.
9. Fill into suitable containers.